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| 09/881,218 | 06/13/2001 | Ansheng Liu | 042390P11429 | 7592 |

7590

09/25/2003

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EXAMINER

PRITCHETT, JOSHUA L

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/881,218

Applicant(s)

LIU ET AL.

Examiner

Joshua L Pritchett

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,7,8 and 30-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,7,8 and 30-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 April 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This action is in response to Amendment B filed July 28, 2003. Claims 1, 4 and 7-8 have been amended, claims 30-36 have been added and claims 3, 5-6 and 9-29 have been canceled as requested by the applicant.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4, 7-8 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodfellow.

Regarding claim 1, Goodfellow discloses directing an optical beam into a first end of an optical path having the first end and a second end disposed in a semiconductor substrate (col. 3 line 19); reflecting a first portion of the optical beam having a first center wavelength back out from the first end of the optical path (col. 3 lines 35-36; Fig. 2A). Goodfellow further teaches tuning the optical path to reflect a second portion of the optical beam having a second center wavelength back out from the first end of the optical path (col. 3 lines 15-18). Goodfellow lacks

specific reference to first and second silicon materials disposed along the substrate. Goodfellow does teach by alternating a first dielectric material and a second dielectric material in the semiconductor substrate along the optical path between the first end and the second end (col. 4 lines 9-17). One of ordinary skill in the art would know that silicon is a well known and widely used dielectric material to create wavelength selective gratings in optical procedures. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the first and second dielectric materials of Goodfellow be silicon materials for the purpose of cheap and precise production of the filter because the well known and highly documented properties of silicon materials would allow the manufacturer to know how the silicon materials will behave in various environments and the abundance of silicon to create the filter would drive down raw material costs.

Regarding claim 2, Goodfellow teaches confining the optical beam to remain within the optical path between the first and second ends with an optical waveguide disposed in the semiconductor substrate between the first and second ends (col. 3 lines 24-26).

Regarding claim 4, Goodfellow teaches wherein tuning the optical path comprises adjusting a temperature of the first material and the second material with a heater disposed proximate to the optical path through the semiconductor substrate (col. 3 lines 16-19). The use of first and second silicon materials is discussed in the rejection of claim 1 above.

Regarding claim 7, Goodfellow teaches alternating the first material and the second material in the semiconductor substrate along the optical path forms a Bragg grating (col. 3 lines 32-34). The use of first and second silicon materials is discussed in the rejection of claim 1 above.

Regarding claim 8, Goodfellow teaches wherein the second material comprises polysilicon (col. 3 lines 15-20). Goodfellow states the use of “polymer waveguides, silica on silicon waveguides, group III-V material waveguides” as the possible materials to create a waveguide, and polysilicon is a member of the material groups disclosed by Goodfellow.

Regarding claim 36, Goodfellow teaches wherein confining the optical beam to remain within the waveguide comprises forming the optical waveguide with dielectric layers of silicon-on-insulator wafer (col. 4 lines 9-17).

Claims 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodfellow in view of Kapany.

Regarding claim 30, Goodfellow teaches directing an optical beam into a first end of an optical path having a first and second end disposed in a semiconductor substrate (col. 3 line 19); reflecting a first portion of the optical beam having a first center wavelength back out from the first end of the optical path (col. 3 lines 35-36; Fig. 2A) by perturbing the effective index of refraction a plurality of times along the optical path (col. 3 lines 32-34) and tuning the optical path to reflect a second portion of the optical beam having a second center wavelength back out from the first end of the optical path (col. 3 lines 15-18). Goodfellow lacks reference to the insulated conductor structure protruding into the optical path. Kapany teaches the use of insulated (48) conductor (50) structure protruding into the optical path. The optical path of Kapany includes all the layers inside body 57 (Fig. 4A) because the light can diffuse slightly into the other layers especially layer 48 from core 47. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the Goodfellow invention

include the insulated conductor structures taught by Kapany for the purpose of using charge modulation to tune the refractive gratings of the wavelength selective filter.

Regarding claims 31, 32 and 35, Goodfellow teaches the invention as claimed including perturbing the effective index of refraction the plurality of times along the optical path by applying a voltage (col. 5 lines 17-21). Goodfellow further teaches that the perturbations for a Bragg grating (col. 3 lines 32-34). Goodfellow lacks reference to the claimed insulated conductor structure. Kapany teaches to use a plurality of insulated conductor structures (Fig. 4B). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the Goodfellow invention include the insulated conductor structures taught by Kapany for the purpose of precisely tuning the refractive indices of the materials in the optical path to filter out only the desired wavelengths.

Regarding claim 33, Goodfellow teaches confining the optical beam to remain within the optical path between the first and second ends with an optical waveguide disposed in the semiconductor substrate between the first and second ends (col. 3 lines 24-26).

Regarding claim 34, Goodfellow teaches wherein confining the optical beam to remain within the waveguide comprises forming the optical waveguide with dielectric layers of silicon-on-insulator wafer (col. 4 lines 9-17).

Response to Arguments

Art Unit: 2872

Applicant's arguments filed July 28, 2003 have been fully considered but they are not persuasive.

On pages 6-7 of Amendment B, applicant argues that Goodfellow does not teach the newly added subject matter therefore all the remaining claims should be allowable. The examiner disagrees that the claims are allowable over the prior art of Goodfellow and Kapany. The rejections discussed above show that the claims as currently written are obvious to a person of ordinary skill in the art in view of the prior art.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2872

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joshua L Pritchett whose telephone number is 703-305-7917. The examiner can normally be reached on Monday - Friday 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A Dunn can be reached on 703-305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JLP

A handwritten signature in black ink, appearing to read 'Drew Dunn', with a stylized, flowing script.

DREW DUNN
SUPERVISORY PATENT EXAMINER